

Appl. No. 09/980,508
Filed: 2 November 2001
Amendment Page 2 of 9

Listing of Claims:

1. (currently amended) Ejection apparatus (103) for separating a molded part from a molding surface (202) of a mold cavity (122) defined by a pair of cooperating mold members (118, 120) in a mold assembly of an injection molding machine (99), the mold assembly including at least one ejector pin (200) mounted in an ejector plate (216) for movement relative to the molding surface (202), an ejector rod (222) extending from the ejector plate (216) and slidably supported in a movable platen (116) that carries one of the mold members (118), the ejector rod (222) connecting to a knock-out bar (230), the ejection apparatus including an electrically-powered ejector drive system for moving the ejector plate (216) relative to the molding surface (202) with an electric motor (240) having a rotatable output shaft (244), and characterized in that the ejection apparatus further comprises:
- 5 a cam member (252) connected with the motor output shaft (244), a cam follower (260) operatively coupled with the knock-out bar (230), wherein the ejector rod (222) is slidably carried by the knock-out bar (230) for limited relative movement, and a spring (234) is positioned between an end (232) of the ejector rod (222) and the knock-out bar (230), therefor spring being compressed by over-travel of biasing the knock-out bar (230) relative to the ejector plate in a direction away from toward the mold member (118), such that the cam follower (260) interacts with the cam member (252) to convert rotation of motor drive shaft (244) to linear movement of the ejector plate (216) toward and away from relative to the molding surface (202) when the
- 10 motor (240) is rotated in only one direction of rotation.
- 15
- 20

2. (currently amended) Ejection apparatus in accordance with claim 1, wherein characterized in that the ejector pin (200a) is slidably carried by the ejector plate (216).

3. (currently amended) Ejection apparatus in accordance with claim 2, wherein characterized in that the ejector pin (200a) includes an enlarged end stop member (208) at its inner end to limit outward travel of the ejector pin (200a) relative to the ejector plate (216).

Appl. No. 09/980,508
Filed: 2 November 2001
Amendment Page 3 of 9

4. (currently amended) Ejection apparatus in accordance with claim 3,
~~wherein characterized in that~~ the ejector pin (200a) includes an intermediate, outwardly-
extending flange (240), and a compression spring (242) positioned between the flange (240)
and the ejector plate (246) for biasing the ejector pin (200a) into an extended position
5 relative to the ejector plate (246).

5. (currently amended) Ejection apparatus in accordance with claim 1,
~~wherein characterized in that~~ the cam member (252) includes a substantially circular cam
track (254) and the cam track is offset from an axis of the drive shaft that rotates the cam
member so that the cam follower moves linearly in a direction toward and away from the
5 molding surface.

6. (canceled)

7. (currently amended) Ejection apparatus in accordance with claim 56,
~~wherein characterized in that~~ the cam member (252) includes means for adjusting the relative
offset of the cam track (254) to the axis of the drive shaft (250).

8. (currently amended) Ejection apparatus in accordance with claim 7,
~~wherein characterized in that~~ the means for adjusting the relative offset of the cam track
(254) comprises discrete alternate mounting locations for the drive shaft (250) in the cam
member (252).

9. (currently amended) Ejection apparatus in accordance with claim 7,
~~wherein characterized in that~~ the means for adjusting the relative offset of the cam track
(254) comprises means for variably displacing the location of the drive shaft (250) relative to
a central axis of the cam member (252).

10. (currently amended) Ejection apparatus in accordance with claim 9,
~~wherein characterized in that~~ the means for variably displacing the location of the drive shaft
(250) relative to a central axis of the cam member (252) comprises a bearing block (270) to
receive the drive shaft (250) and means for adjusting the mounting position of the bearing

Appl. No. 09/980,508
Filed: 2 November 2001
Amendment Page 4 of 9

5 block-(270) in the cam member-(252).

11. (currently amended) Ejection apparatus in accordance with claim 5,
wherein~~characterized in that~~ the cam track-(254) of the cam member-(252) includes at least
one portion-(280) that varies from the substantially circular path of the cam track-(254) to
generate a pulsation in the linear movement of the ejector plate-(216) when the cam member
5 (252) is rotated.

12. (currently amended) Ejection apparatus in accordance with claim 1,
wherein~~characterized in that~~ the motor-(240) drives a first drive pulley-(242) that includes a
first one-way clutch operatively coupled with the ejector drive system for moving the ejector
pin-(200) toward and away from the molding surface-(202) while the motor-(240) rotates in
5 only one direction of rotation, the motor-(240) also driving a second drive pulley-(264) that
includes a second one-way clutch operatively coupled with a second drive system of the
injection molding machine-(99), such that the second drive system operates only when the
motor-(240) rotates in a direction opposite from that for operating the ejector drive system.